PREFACE.

Mathematical Logic is a necessary preliminary to logical Mathematics. "Mathematical Logic" is the name given by PEANO to what is also known (after VENN) as "Symbolic Logic"; and Symbolic Logic is, in essentials, the Logic of Aristotle, given new life and power by being dressed up in the wonderful—almost magical—armour and accoutrements of Algebra. In less than seventy years, logic, to use an expression of DE MORGAN's, has so *thriven* upon symbols and, in consequence, so grown and altered that the ancient logicians would not recognize it, and many old-fashioned logicians will not recognize it. The metaphor is not quite correct: Logic has neither grown nor altered, but we now see more *of* it and more *into* it.

The primary significance of a symbolic calculus seems to lie in the economy of mental effort which it brings about, and to this is due the characteristic power and rapid development of mathematical knowledge. Attempts to treat the operations of formal logic in an analogous way had been made not infrequently by some of the more philosophical mathematicians, such as LEIBNIZ and LAMBERT; but their labors remained little known, and it was BOOLE and DE MORGAN, about the middle of the nineteenth century, to whom a mathematical—though of course non-quantitative—way of regarding logic was due. By this, not only was the traditional or Aristotelian doctrine of logic reformed and completed, but out of it has developed, in course of time, an instrument which deals in a sure manner with the task of investigating the fundamental concepts of mathematics—a task which philosophers have repeatedly taken in hand, and in which they have as repeatedly failed.